		Flight-Testing New	ton's I aws			
2009 Science						
Academic Standards						
Minnesota Science		/toddomio Gtal				
Grades 9-12						
Activity/Lesson	State	Standards				
7.00.71.g/0000	- Ctuto	- Curruur us	Explain and calculate the acceleration of an			
		SCI.9-	object subjected to a set of forces in one			
Session-10 (1-5)	MN	12.9.2.2.2.2	dimension (F = ma).			
		12.0.2.2.2	Demonstrate that whenever one object exerts			
			force on another, a force equal in magnitude and			
		SCI.9-	opposite in direction is exerted by the second			
Session-10 (1-5)	MN	12.9.2.2.2.3	object back on the first object.			
00001011 10 (1 0)	1711 4	12.0.2.2.2.0	object back on the mot object.			
		SCI.9-	Recognize that inertia is the property of an			
Session-1 (1-17)	MN	12.9.2.2.2.1	object that causes it to resist changes in motion.			
			Explain and calculate the acceleration of an			
		SCI.9-	object subjected to a set of forces in one			
Session-1 (1-17)	MN	12.9.2.2.2.2	dimension (F = ma).			
		12.0.2.2.2	Demonstrate that whenever one object exerts			
			force on another, a force equal in magnitude and			
		SCI.9-	opposite in direction is exerted by the second			
Session-1 (1-17)	MN	12.9.2.2.2.3	object back on the first object.			
00001011 1 (1 11)	1711 4	12.0.2.2.2.0	Use Newton's universal law of gravitation to			
			describe and calculate the attraction between			
		SCI.9-	massive objects based on the distance between			
Session-1 (1-17)	MN	12.9.2.2.2.4	them.			
00001011 1 (1 17)	17114	12.0.2.2.7	Explain and calculate the acceleration of an			
		SCI.9-	object subjected to a set of forces in one			
Session-2 (1-10)	MN	12.9.2.2.2.2	dimension (F = ma).			
CCCCICIT 2 (1 10)	1711 4	12.0.2.2.2	Demonstrate that whenever one object exerts			
			force on another, a force equal in magnitude and			
		SCI.9-	opposite in direction is exerted by the second			
Session-2 (1-10)	MN	12.9.2.2.2.3	object back on the first object.			
00331011-2 (1-10)	1		Use Newton's universal law of gravitation to			
			describe and calculate the attraction between			
		SCI.9-	massive objects based on the distance between			
Session-2 (1-10)	MN	12.9.2.2.2.4	them.			
			Explain and calculate the acceleration of an			
		SCI.9-	object subjected to a set of forces in one			
Session-3 (1-6)	MN	12.9.2.2.2.2	dimension (F = ma).			
2230.0.1.0 (1.0)		12.0.2.2.2	Demonstrate that whenever one object exerts			
			force on another, a force equal in magnitude and			
		SCI.9-	opposite in direction is exerted by the second			
Session-3 (1-6)	MN	12.9.2.2.2.3	object back on the first object.			
20000011 0 (1 0)		12.0.2.2.2.0	Demonstrate that whenever one object exerts			
			force on another, a force equal in magnitude and			
		SCI.9-	opposite in direction is exerted by the second			
Session-5 (1-6)	MN	12.9.2.2.3	object back on the first object.			
36881011-3 (1-0)	IVIIN	12.3.2.2.2.3	Explain and calculate the acceleration of an			
		SCI.9-	object subjected to a set of forces in one			
Session-6 (1-8)	MN	12.9.2.2.2.2	dimension (F = ma).			
00331011-0 (1-0)	INIIA	14.3.4.4.4				

		SCI.9-	Demonstrate that whenever one object exerts force on another, a force equal in magnitude and opposite in direction is exerted by the second
Session-6 (1-8)	MN	12.9.2.2.3	object back on the first object.
Session-7 (1-5)	MN	SCI.9- 12.9.2.2.2.2	Explain and calculate the acceleration of an object subjected to a set of forces in one dimension (F = ma).
00331011-7 (1-0)	IVIIA	12.5.2.2.2	Demonstrate that whenever one object exerts
Session-7 (1-5)	MN	SCI.9- 12.9.2.2.2.3	force on another, a force equal in magnitude and opposite in direction is exerted by the second object back on the first object.
Session-8 (1-9)	MN	SCI.9- 12.9.2.2.2.3	Demonstrate that whenever one object exerts force on another, a force equal in magnitude and opposite in direction is exerted by the second object back on the first object.
00001011 0 (1 0)	IVII	12.0.2.2.2.0	Demonstrate that whenever one object exerts
Session-9 (1-7)	MN	SCI.9- 12.9.2.2.2.3	force on another, a force equal in magnitude and opposite in direction is exerted by the second object back on the first object.
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		Flight-Testing New	ton's Laws
		2009 Scien	ce
		Academic Star	ndards
Minnesota Science			
Grades 9-12 (Phys			
Activity/Lesson	State	Standards	
Session-10 (1-5)	MN	SCI.9- 12.9P.2.2.1.1	Use vectors and free-body diagrams to describe force, position, velocity and acceleration of objects in two-dimensional space.
Session-10 (1-5)	MN	SCI.9- 12.9P.2.2.1.2	Apply Newton's three laws of motion to calculate and analyze the effect of forces and momentum on motion.
Session-10 (1-5)	MN	SCI.9- 12.9P.2.2.2.2	Describe and calculate the change in velocity for objects when forces are applied perpendicular to the direction of motion.
Session-1 (1-17)	MN	SCI.9- 12.9P.2.2.1.1	Use vectors and free-body diagrams to describe force, position, velocity and acceleration of objects in two-dimensional space.
Session-1 (1-17)	MN	SCI.9- 12.9P.2.2.1.2	Apply Newton's three laws of motion to calculate and analyze the effect of forces and momentum on motion.
Session-1 (1-17)	MN	SCI.9- 12.9P.2.2.2.2	Describe and calculate the change in velocity for objects when forces are applied perpendicular to the direction of motion.
Session-2 (1-10)	MN	SCI.9- 12.9P.2.2.1.1	Use vectors and free-body diagrams to describe force, position, velocity and acceleration of objects in two-dimensional space.

Session-2 (1-10)	MN	SCI.9- 12.9P.2.2.1.2	Apply Newton's three laws of motion to calculate and analyze the effect of forces and momentum on motion.
		SCI.9-	Describe and calculate the change in velocity for objects when forces are applied perpendicular to
Session-2 (1-10)	MN	12.9P.2.2.2.2	the direction of motion.
Session-3 (1-6)	MN	SCI.9- 12.9P.2.2.1.1	Use vectors and free-body diagrams to describe force, position, velocity and acceleration of objects in two-dimensional space.
Session-3 (1-6)	MN	SCI.9- 12.9P.2.2.1.2	Apply Newton's three laws of motion to calculate and analyze the effect of forces and momentum on motion.
Session-3 (1-6)	MN	SCI.9- 12.9P.2.2.2.2	Describe and calculate the change in velocity for objects when forces are applied perpendicular to the direction of motion.
Session-4 (1-11)	MN	SCI.9- 12.9P.2.2.1.2	Apply Newton's three laws of motion to calculate and analyze the effect of forces and momentum on motion.
Session-5 (1-6)	MN	SCI.9- 12.9P.2.2.1.1	Use vectors and free-body diagrams to describe force, position, velocity and acceleration of objects in two-dimensional space.
Session-5 (1-6)	MN	SCI.9- 12.9P.2.2.1.2	Apply Newton's three laws of motion to calculate and analyze the effect of forces and momentum on motion.
Session-5 (1-6)	MN	SCI.9- 12.9P.2.2.2.2	Describe and calculate the change in velocity for objects when forces are applied perpendicular to the direction of motion.
Session-6 (1-8)	MN	SCI.9- 12.9P.2.2.1.1	Use vectors and free-body diagrams to describe force, position, velocity and acceleration of objects in two-dimensional space.
Session-6 (1-8)	MN	SCI.9- 12.9P.2.2.1.2	Apply Newton's three laws of motion to calculate and analyze the effect of forces and momentum on motion.
Session-6 (1-8)	MN	SCI.9- 12.9P.2.2.2.2	Describe and calculate the change in velocity for objects when forces are applied perpendicular to the direction of motion.
Session-7 (1-5)	MN	SCI.9- 12.9P.2.2.1.1	Use vectors and free-body diagrams to describe force, position, velocity and acceleration of objects in two-dimensional space.
Session-7 (1-5)	MN	SCI.9- 12.9P.2.2.1.2	Apply Newton's three laws of motion to calculate and analyze the effect of forces and momentum on motion.
Session-7 (1-5)	MN	SCI.9- 12.9P.2.2.2.2	Describe and calculate the change in velocity for objects when forces are applied perpendicular to the direction of motion.
Session-8 (1-9)	MN	SCI.9- 12.9P.2.2.1.1	Use vectors and free-body diagrams to describe force, position, velocity and acceleration of objects in two-dimensional space.

Session-8 (1-9)	MN	SCI.9- 12.9P.2.2.1.2	Apply Newton's three laws of motion to calculate and analyze the effect of forces and momentum on motion.
Session-8 (1-9)	MN	SCI.9- 12.9P.2.2.2.2	Describe and calculate the change in velocity for objects when forces are applied perpendicular to the direction of motion.
Session-9 (1-7)	MN	SCI.9- 12.9P.2.2.1.1	Use vectors and free-body diagrams to describe force, position, velocity and acceleration of objects in two-dimensional space.
Session-9 (1-7)	MN	SCI.9- 12.9P.2.2.1.2	Apply Newton's three laws of motion to calculate and analyze the effect of forces and momentum on motion.
Session-9 (1-7)	MN	SCI.9- 12.9P.2.2.2.2	Describe and calculate the change in velocity for objects when forces are applied perpendicular to the direction of motion.